STDs in Women and Infants

Public Health Impact

Women and infants disproportionately bear the long term consequences of STDs. Women infected with *Neisseria gonorrhoeae* or *Chlamydia trachomatis* can develop pelvic inflammatory disease (PID), which, in turn, may lead to adverse reproductive consequences, e.g., ectopic pregnancy and tubal factor infertility. If not adequately treated, 20% to 40% of women infected with chlamydia[1] and 10% to 40% of women infected with gonorrhea[2] develop PID. Among women with PID, scarring sequelae will cause involuntary infertility in 20%, ectopic pregnancy in 9%, and chronic pelvic pain in 18%[3]. Approximately 70% of chlamydial infections and 50% of gonococcal infections in women are asymptomatic[4-6]. These infections are detected primarily through screening programs. The vague symptoms associated with chlamydial and gonococcal PID cause 85% of women to delay seeking medical care, thereby increasing the risk of infertility and ectopic pregnancy[7]. Data from a randomized controlled trial of chlamydia screening in a managed care setting suggest that such screening programs can reduce the incidence of PID by as much as 60%[8].

Gonorrhea and chlamydia also result in adverse outcomes of pregnancy, including neonatal ophthalmia and, in the case of chlamydia, neonatal pneumonia. Although topical prophylaxis at delivery is effective for prevention of ophthalmia neonatorum, prevention of neonatal pneumonia requires antenatal detection and treatment.

Infections with human papillomavirus (HPV) in women are a major concern because specific HPV subtypes (e.g., types 16, 18, 31, 33, and 35) have been associated epidemiologically with cervical dysplasia and cervical cancer. HPV types 6 and 11 in child bearing women can cause laryngeal papillomatosis in infants.

When a woman has a syphilis infection during pregnancy, she may transmit the infection to the fetus in utero. This may result in fetal death or an infant born with physical and mental developmental disabilities. Most cases of congenital syphilis are preventable if women are screened for syphilis and treated early during prenatal care[9].

Observations

- Between 1997 and 1998, the reported rate of chlamydial infections in women increased from 336.9 per 100,000 population to 382.2 (Figure 6, Table 6). This increase most likely reflects a variety of different factors (e.g., increased screening activities, the increased use of more recently developed diagnostic test procedures, changes to information systems to incorporate laboratory reporting, etc.) rather than an increase in number of cases in women; even as reported cases have increased, prevalence among women screened in the U.S. has generally declined (see section on Chlamydia). Despite considerable under-reporting, it is

important to note that chlamydia rates exceed gonorrhea rates in women in many states (Figures A and B, Tables 6 and 15).

- For gonorrhea, the Healthy People year 2000 objective is 100 cases per 100,000 persons. Gonorrhea rates for women alone exceeded this HP2000 objective in 24 states (Figure B, Table 15), an increase of 4 additional states over the preceding year. The highest rates of gonorrhea for women were concentrated in the South.
- Like chlamydia, gonorrhea is often asymptomatic in women and can only be identified through screening. Large-scale screening programs for gonorrhea in women began in the late 1970s. After an initial increase in cases detected through screening, gonorrhea rates for both women and men declined steadily throughout the 1980s and early 1990s (Figure 15, Tables 15 and 16). Gonorrhea rates for women increased from 119.0 cases per 100,000 population in 1997 to 131.5 in 1998; rates for men also increased from 124.9 to 133.7 between 1997 and 1998. Men with gonorrhea are usually symptomatic and may seek care; therefore, trends in men may be a relatively good indicator of trends in incidence of disease. However, trends in women are determined more by screening practices, similar to chlamydia.
- The Healthy People year 2000 objective for primary and secondary syphilis is 4.0 per 100,000 persons. Primary and secondary syphilis rates for women exceeded the HP2000 objective in 8 southern states and 1 outlying area (Figure C, Table 26). Five southern states (Louisiana, Maryland, Mississippi, North Carolina, and Tennessee) had rates for women that were at least twice the HP2000 objective for primary and secondary syphilis (Table 26). For congenital syphilis, the Healthy People year 2000 objective is 40 per 100,000 live births. Three states (Arkansas, Maryland, and New Jersey) and Puerto Rico had rates that exceeded the HP2000 objective (Figure D, Table 38).
- The rate of congenital syphilis closely follows the trend of P&S syphilis in women (Figure 35). Peaks in congenital syphilis usually occur one year after peaks in P&S syphilis in women. The congenital syphilis rate peaked in 1991 at 107.3 cases per 100,000 live births and has declined by approximately 80% to 20.6 in 1998 (Figure 36, Table 37). The rate of P&S syphilis in women peaked at 17.3 per 100,000 persons in 1990 and declined 87% to 2.3 in 1998 (Figure 35, Table 26).
- In 1998, state-specific chlamydia test positivity among 15 to 24 year old women screened in selected prenatal clinics in 21 states ranged from 3.7%-14.5% (Figure E).
- In 1998, state-specific gonorrhea test positivity among 15 to 24 year old women screened in selected prenatal clinics in 8 states ranged from 0.9%-4.7% (Figure F).
- Although the 1998 rate of congenital syphilis was below the Healthy People 2000 objective of 40 cases per 100,000 live births, this objective is many times greater than the rate of congenital syphilis of most industrialized countries where syphilis and congenital syphilis have nearly been eliminated[10].
- Accurate estimates of pelvic inflammatory disease (PID) and tubal factor infertility from gonococcal and chlamydial infections are difficult to obtain. Definitive diagnosis of these conditions can be complex, requiring for example, laparoscopy or laparotomy, while tubal patency studies may be needed to accurately document these conditions. Most cases of PID are treated on the basis of interpretations of clinical findings, which vary between individual practitioners. In

addition, the settings in which care is provided can vary considerably over time. For example, women with PID who would have been hospitalized in the 1980s may be treated in out-patient facilities during the 1990s. Trends in hospitalized PID have declined steadily throughout the 1980s and early 1990s but were similar for 1994-1997 (Figure H). However, these trends may be more reflective of changes in the etiologic spectrum (with increasing proportions of more indolent chlamydial infection) and clinical management of PID (from in-patient to out-patient) rather than true trends in disease[11].

- Recent evidence suggests that health care practices associated with ectopic pregnancy also changed in the late 1980s and early 1990s. Before that time, treatment of ectopic pregnancy usually required admission to a hospital. Hospitalization statistics were therefore useful for monitoring trends in ectopic pregnancy (Figure G). Beginning in 1990, hospitalizations for ectopic pregnancy began to decline. Data from outpatient care surveys suggest that nearly half of all ectopic pregnancies are treated on an outpatient basis[12]. The total number of ectopic pregnancies in the U.S. in 1992 was estimated to be 108,800 (or 19.7 cases per 1,000 pregnancies), the highest level in more than two decades[12].
- Initial visits to physicians' offices for PID declined from 1993 to 1995, increased in 1996, and again decreased in 1997 and 1998 (Figure I). Among women 15 to 44 years of age, the estimated number of PID cases diagnosed in emergency departments was about 233,000 in 1997 (National Hospital Ambulatory Medical Care Survey, NCHS). This estimate has a relative standard error of 18%.

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[1]Stamm WE, Guinan ME, Johnson C. Effect of treatment regimens for *Neisseria gonorrhoeae* on simultaneous infections with *Chlamydia trachomatis*. *N Engl J Med* 1984;310:545-9.

[2]Platt R, Rice PA, McCormack WM. Risk of acquiring gonorrhea and prevalence of abnormal adnexal findings among women recently exposed to gonorrhea. *JAMA* 1983;250:3205-9.

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[10]Division of STD/HIV Prevention. Healthy People 2000: National Health Promotion and Disease Objectives. Progress Review: Sexually Transmitted Diseases, October 26, 1994.

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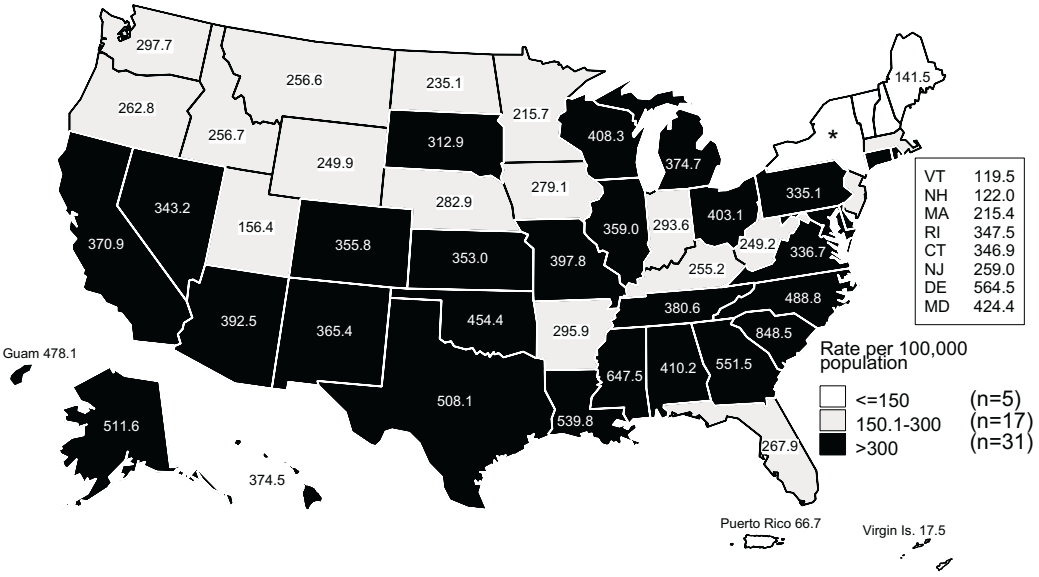
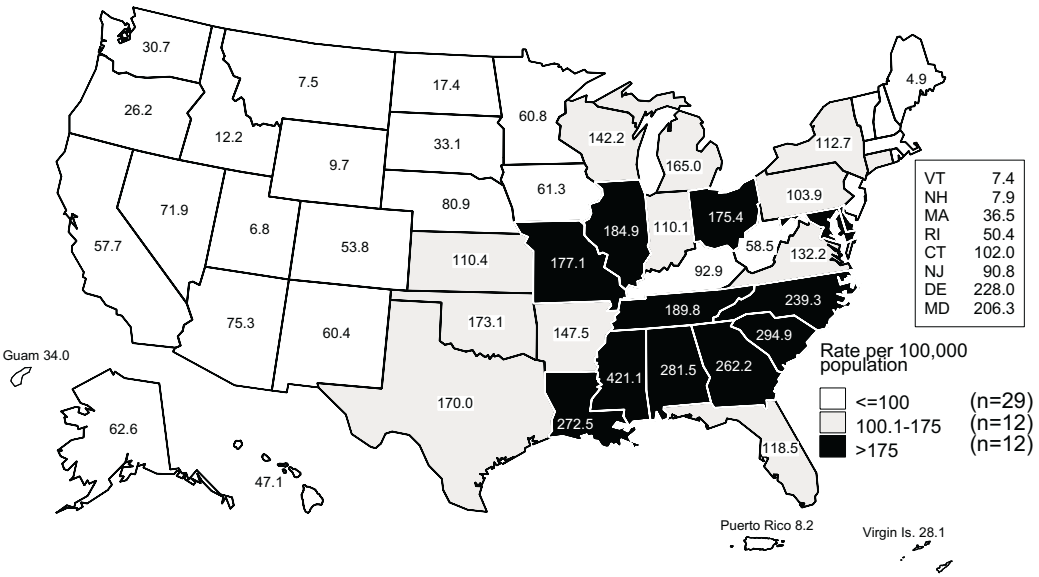
Figure A. Chlamydia — Rates for women by state: United States and outlying areas, 1998



*The New York City rate was 604.6 per 100,000 population. No cases were reported outside of New York City.

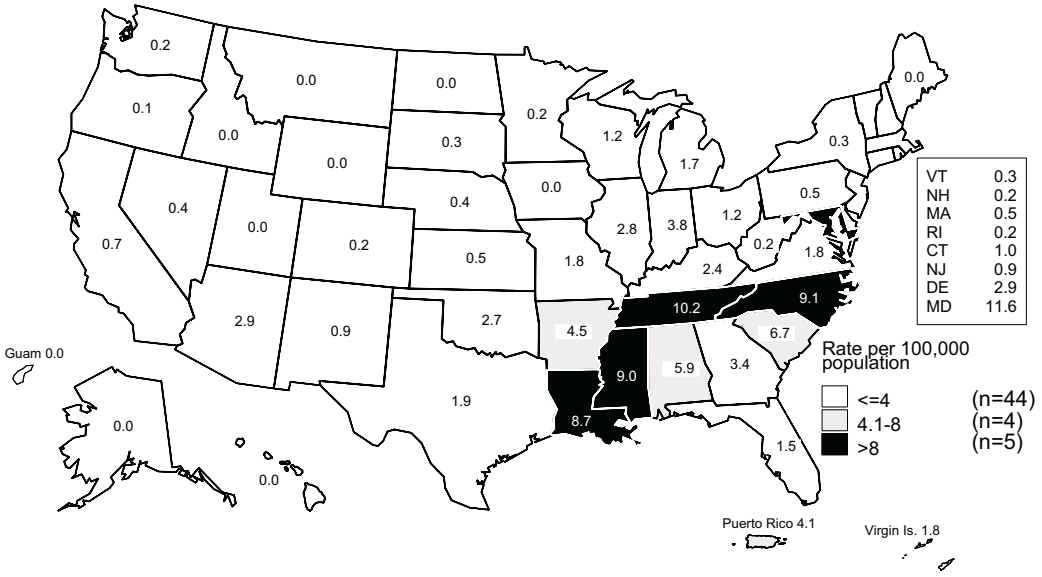
Note: The total rate of chlamydia for women in the United States and outlying areas (including Guam, Puerto Rico and Virgin Islands) was 377.4 per 100,000 population. For further information on chlamydia reporting see the Appendix.

Figure B. Gonorrhea — Rates for women by state: United States and outlying areas, 1998



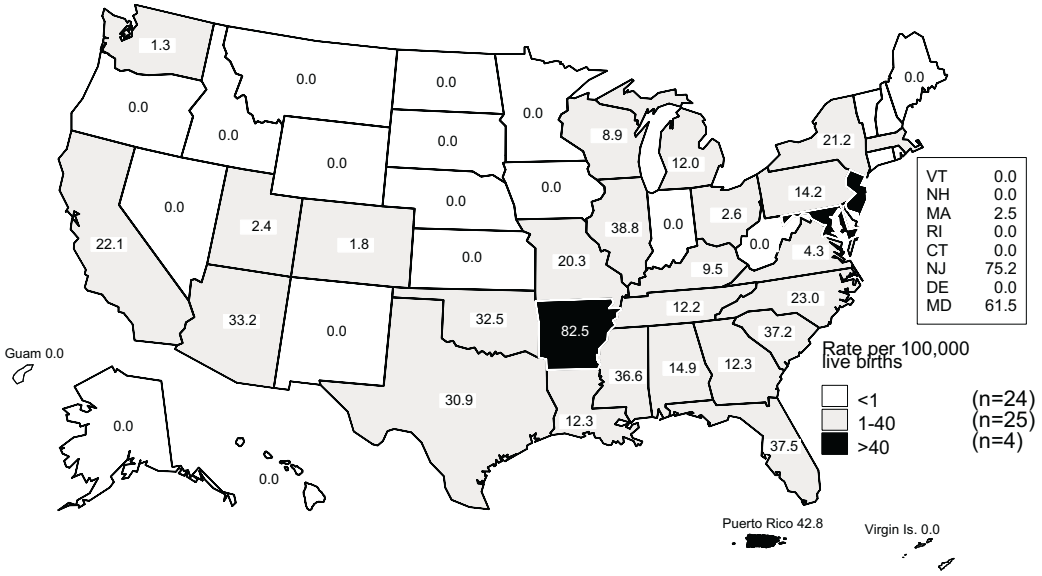
Note: The total rate of gonorrhea for women in the United States and outlying areas (including Guam, Puerto Rico and Virgin Islands) was 129.6 per 100,000 population. The Healthy People year 2000 objective is 175 per 100,000 population for women aged 15-44.

Figure C. Primary and secondary syphilis — Rates for women by state: United States and outlying areas, 1998



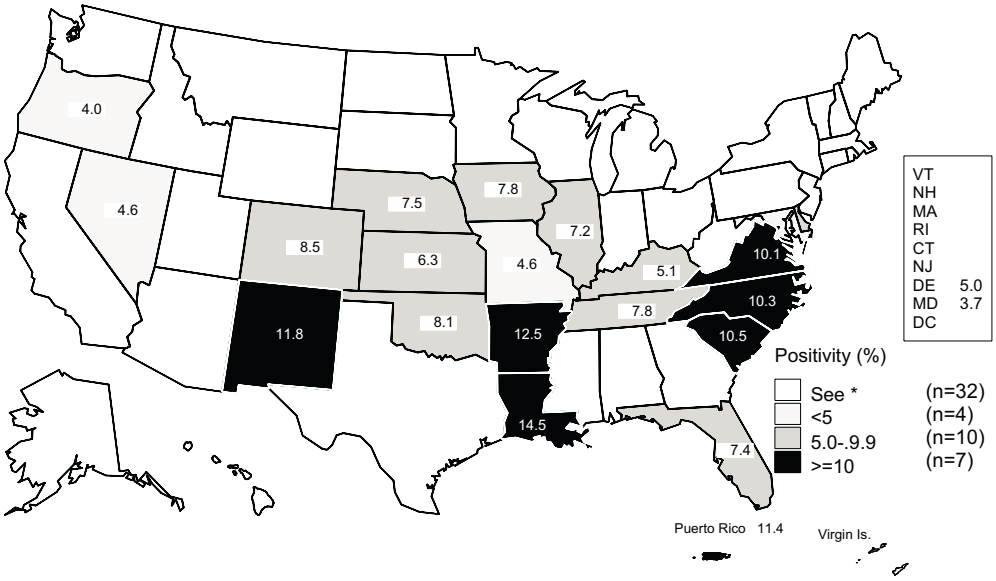
Note: The total rate of primary and secondary syphilis for women in the United States and outlying areas (including Guam, Puerto Rico and Virgin Islands) was 2.3 per 100,000 population. The Healthy People year 2000 objective is 4.0 per 100,000 population.

Figure D. Congenital syphilis — Rates for infants <1 year of age by state: United States and outlying areas, 1998



Note: The total rate of congenital syphilis for infants <1 year of age for the United States and outlying areas (including Guam, Puerto Rico and Virgin Islands) was 20.9 per 100,000 live births. The Healthy People year 2000 objective is 40.0 per 100,000 live births.

Figure E. Chlamydia — Positivity among 15-24 year old women tested in prenatal clinics by state, 1998

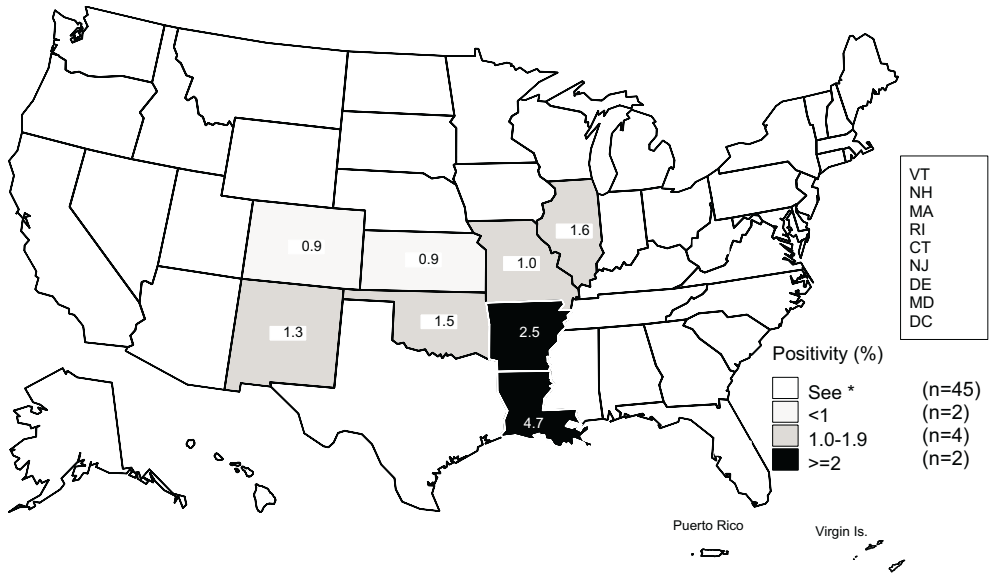


*States not reporting chlamydia positivity data in prenatal clinics.

Note: States reported chlamydia positivity data on at least 500 women aged 15-24 years during 1998 except for Colorado, Nevada, New Mexico, and Oregon. Puerto Rico reported chlamydia positivity data for January - April only.

SOURCE: Regional Infertility Prevention Programs; Office of Population Affairs; Local and State STD Control Programs; Centers for Disease Control and Prevention

Figure F. Gonorrhea — Positivity among 15-24 year old women tested in prenatal clinics by state, 1998

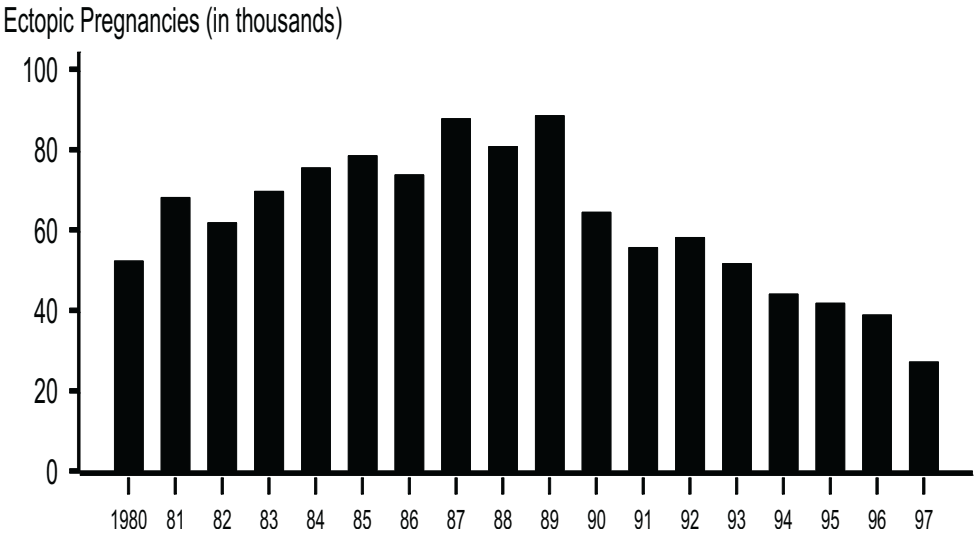


*States not reporting gonorrhea positivity data in prenatal clinics.

Note: States reported gonorrhea positivity data on at least 500 women aged 15-24 years during 1998 except for Colorado and New Mexico.

SOURCE: Regional Infertility Prevention Programs; Office of Population Affairs; Local and State STD Control Programs; Centers for Disease Control and Prevention

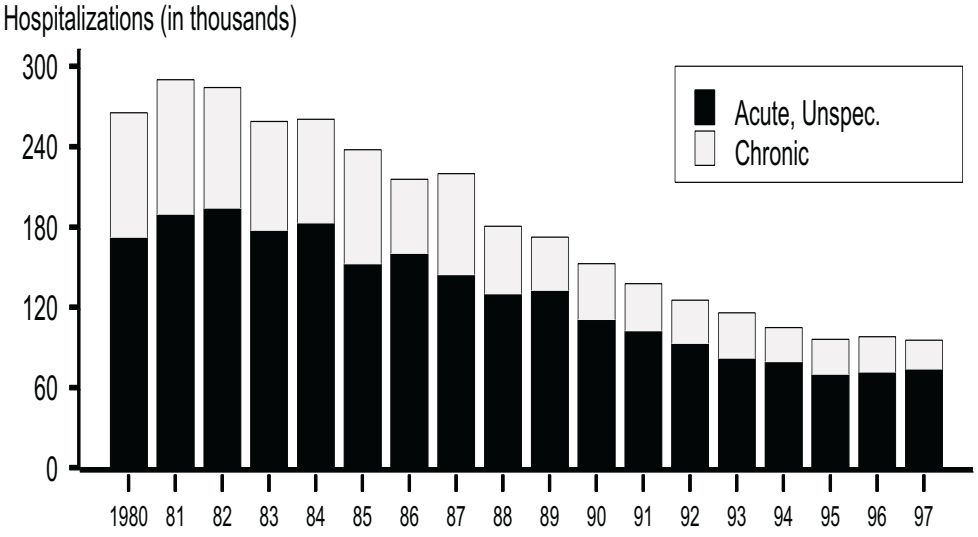
Figure G. Ectopic pregnancy — Hospitalizations of women 15-44 years of age: United States, 1980-1997



Note: Some variations in 1981 and 1988 numbers may be due to changes in sampling procedures. The relative standard error for these estimates ranges from 8% to 11%.

SOURCE: National Hospital Discharge Survey (National Center for Health Statistics, CDC)

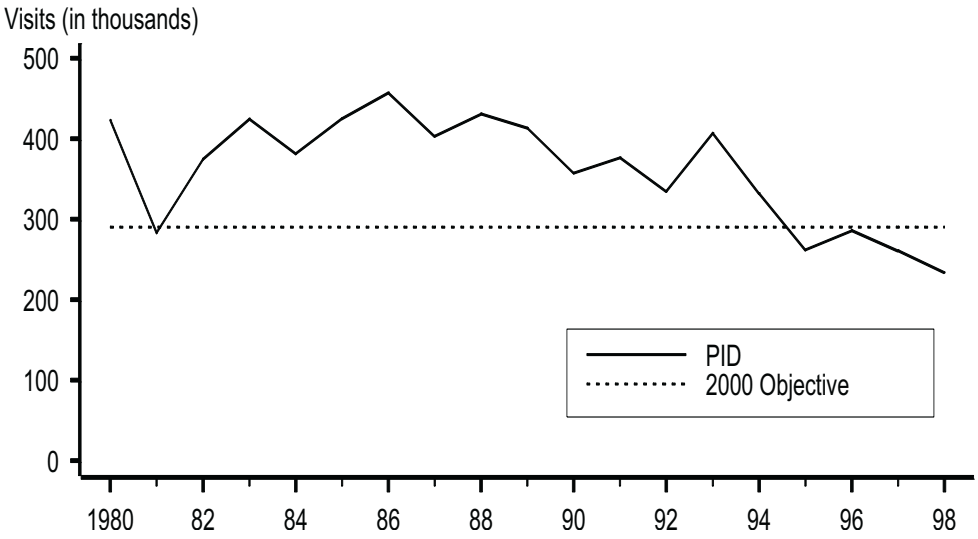
Figure H. Pelvic inflammatory disease — Hospitalizations of women 15-44 years of age: United States, 1980–1997



Note: The relative standard error for the estimates of the overall total number of PID cases range from 6% to 9%.

SOURCE: National Hospital Discharge Survey (National Center for Health Statistics, CDC)

Figure I. Pelvic inflammatory disease — Initial visits to physicians' offices by women 15-44 years of age: United States, 1980–1998 and Healthy People year 2000 objective



Note: See Appendix.

SOURCE: National Disease and Therapeutic Index (IMS America, Ltd.)